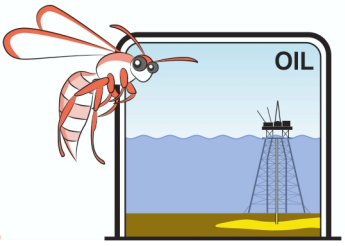
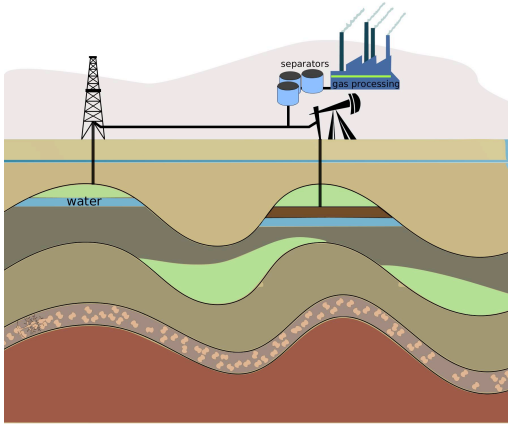


Oil and Gas – Teacher Notes

Insert these words into the correct blanks in the paragraph below:

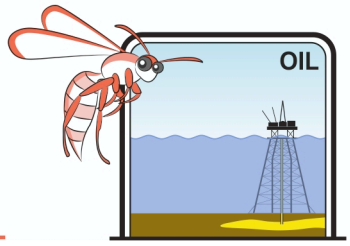
○ above	○ offshore
○ animals	○ permeable
○ below	○ petrol plants
○ domestic gas	○ pressure
○ drill	○ refinery
○ half	○ reservoir
○ hydrocarbons	○ source rocks
impermeable	○ 3-5km
○ kerogen	○ 4-6km
○ non-renewable	○ 60%



Oil and gas are hydrocarbons. These fuels are sources of non-renewable energy.

They started out as microscopic dead marine plants and animals that were buried in the ocean sediment. Pressure from overlying sediments above and heat from below changed them into a substance called kerogen. The rocks in which these fragments are held in very low concentrations are called source rocks. More heat and pressure change this substance into oil or gas. Oil forms at depths between 3-5 km while gas forms at about 4-6 km below the surface of the Earth. Continuing pressure forces oil and gas to migrate upwards through permeable rocks until an impermeable layer or rock structure traps them. If enough oil or gas is trapped, this is called a reservoir. If they are not trapped, the oil and gas are broken down by bacteria or escape into the atmosphere. To bring these fuels to the surface, we first drill holes down to the reservoir, and then pump the oil and gas up pipes. Crude oil and gas is then sent to the refinery to be separated into useful products such as domestic gas, petrol, diesel, and aviation fuel. Most of Western Australia's oil and gas is found offshore. Burning natural gas releases 60% less greenhouse gases compared to burning coal.

Oil and Gas – Teacher Notes



Explanations of terms - Fill in the blanks:

- Hydrocarbons are molecules built from atoms of hydrogen, oxygen and carbon.
- Non-renewable resources take a very long time - geological time - to be created and replenished (if ever). Renewable resources are replenished within a human timescale.
- Plants and animals are the original source for oil and gas. Most of the oil and gas in WA was formed from marine plankton. Elsewhere, coastal swampy lagoons may have trapped dead terrestrial and plants and animals creating source rocks.
- Kerogen are waxy, dense, tiny specks of 'pressure cooked' organic matter that may later be concentrated and eventually changed to become oil or gas. This process can take perhaps 150 million years to complete.
- Source rocks are rocks that have low concentrations of hydrocarbons but these can be concentrated as they are trapped over time.
- 3 and 5km is the depth range beneath Earth's surface which provides just enough heat and pressure to form oil. Closer to the surface bacteria break down the oil to form tar.
- 4 and 6 km is the depth range beneath Earth's surface which provides the greater heat and pressure necessary to form gas. At depths of over 6km the kerogen becomes carbonised.
- Permeable rocks allow liquids and gases to travel through them because they have spaces between their grains that are joined together (called pore spaces).
- Reservoirs are area of permeable rock (or sediment) which have been sealed above by an impermeable rock such as clay or an impermeable structure such as a sealed fault. Hydrocarbons can become concentrated as they migrate from below and become trapped in the reservoir.
- Drill holes are drilled from the surface down into the reservoir. The oil well can be on land or on a platform out at sea.
- A refinery takes the oil, gas, water and other materials from the well head and separates the mix into its useful parts such as petrol and domestic gas. LNG (liquefied natural gas) is exported from Western Australia.